In the initial state (low level of -60 v. on the terminal 2) the left hand half of the tube is closed and on its anode there is a high voltage level; the right hand half of the tube is open through the divider R_1, R_3. At this stage a voltage U_1 is set up on the cathode resistance.

When a pulse emerges slowly rising to a high level appears at terminal 2, the voltage at output of the divider R_7, R_2 rises also and when it reaches the voltage level between, the grid and the cathode of the left hand half of the tube, it will be equal to the cut off voltage of the tube, the left hand half will begin to open. As a result the voltage at the anode of the left hand half begins to fall, the right hand half closes through the divider R_1, and R_3, thereby the voltage on the cathode resistance begins to fall (when the right hand half is closed voltage U_2 is setup on the resistance R_4 ; since R_5 is greater than R_6 this voltage will be less than U_1). The voltage drop on R_4 will open the left hand half which closes the right hand half lowers voltage still more on R_4 and so on. Then regenerative process takes place resulting in the change over of the circuit into the state, at which the left hand half of the tube is open and the right hand half is closed. The circuit will remain in this state as long as high voltage is maintained on terminal 2. When the input voltage falls (the trailing edge of the input pulse) to a level at which the voltage U_{ck} (voltage between the grid and the cathode) of the left hand half begins to become negative (< 0) , the left hand half begins to close, making the right half open through the divider R_1 , R_3 and causing a voltage rise on the cathode resistance R_4 . Then the regenerative action takes place and a change over of the circuit to the initial state occurs. During these operations pulses appear at the outputs of the circuit, negative on terminal 3, positive on terminal 4. 16. Package 0 0 (single flip-flop [illegible]ator). The circuit diagram of the single flip flop

oscillator package is given in fig 5.33.0 and is intended for generation of square pulses of adjustable duration when negative voltage drops are applied at its input.

In the computer, this package is used in the control device, generation of control pulses both in punched tape and magnetic tape storages and for generation of synchronizing pulses.

The cathodes of the two halves of the tube are connected to terminal 11 (earth). The equal anode resistances R_8 and R_9 with the compensating inductances L_1 and L_2 are connected to terminal 1 (anode voltage). The

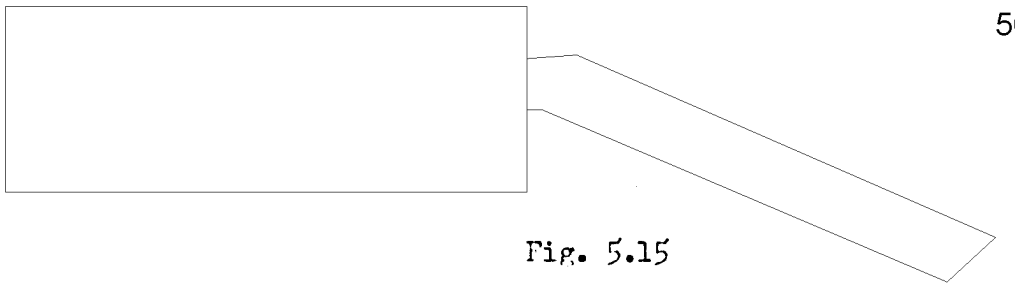
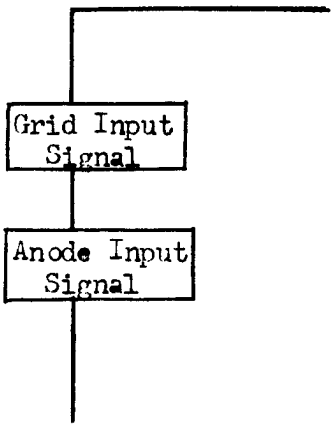


Fig. 4.14

Fig. 5.15



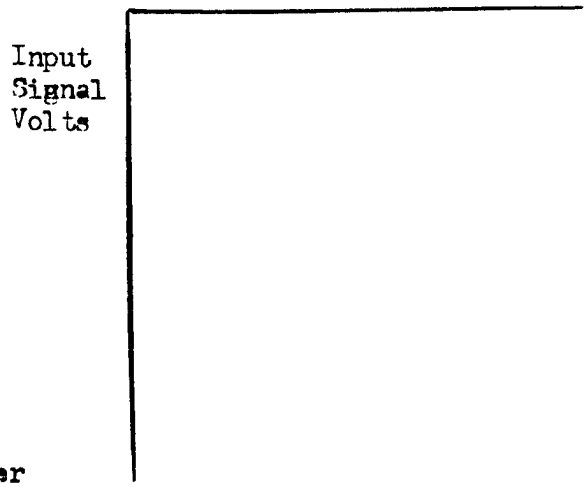


Fig. 4.16

Symbol of the Single Digit Binary Counter

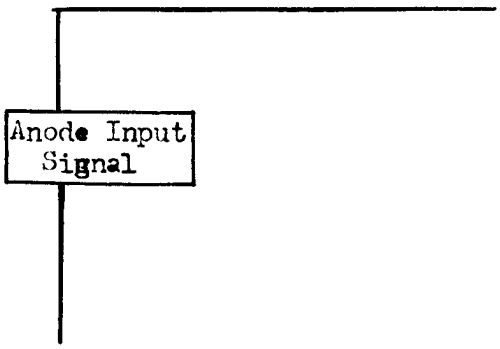


Fig. 4.27

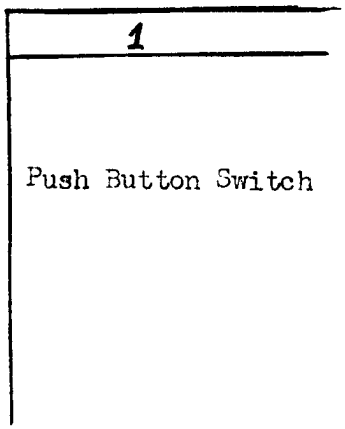


Fig. 4.24

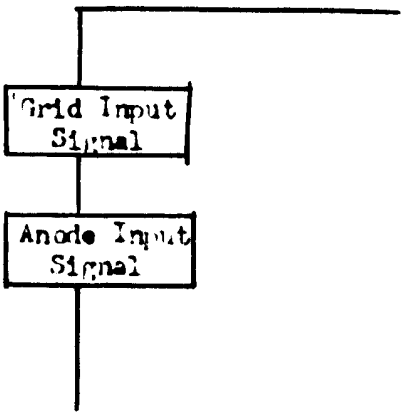


Fig. 4.26

Symbol of the Single Digit Binary Counter

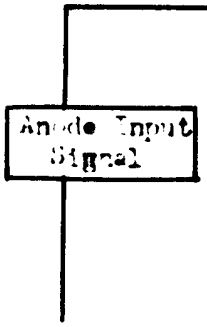


Fig. 4.27

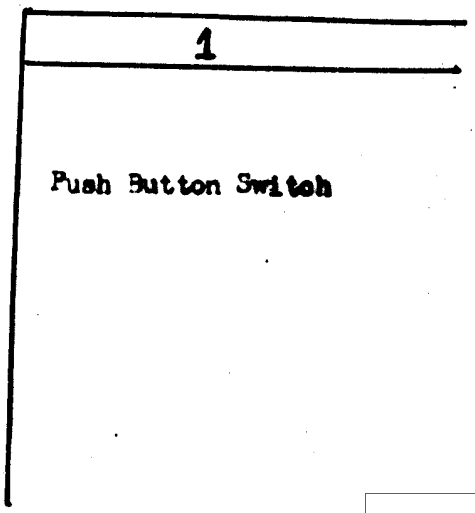
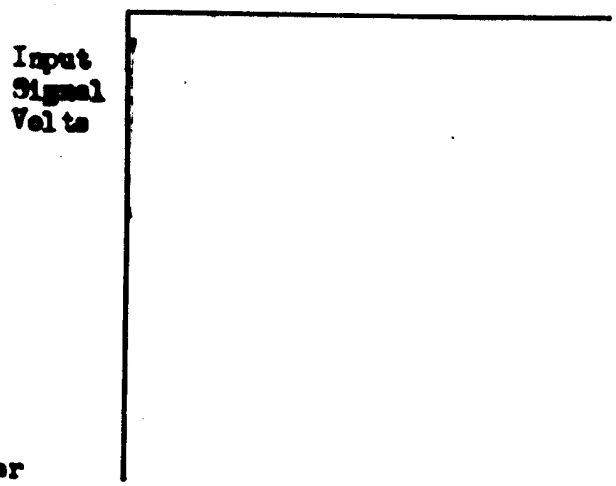


Fig. 5.15



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This instruction can be used in various ways. This instruction permits for example, to call stop in a certain stage of the programme, to introduce or to exclude printing of the result; and permits to call to address some special subroutine of the programme, beginning at some particular stage etc. The place of the programme with the instruction " E 3 K" at the instruction of stop computer, can be consider as a system of the control points of the programme. At the execution of the instruction " E 3 K", signal w is preserved, which was generated in the preceding cycyle.

The fourth operation of control transfer has code "24" and is performed on the instruction "E 4 a".

The instruction "E4a" transfers control to the instruction in location "a" at the beginning of the execution of the cycle operation, and to the next instruction after finishing the cyclic operation.

The instruction "E4a" is used only with the instruction "Start cycle n" (H4n) and put after the group of the instructions, which are performed repeatedly by the help of the instruction "Start cycle n" (H4n). At the instruction (E4a) we must put the address of the instruction with which the cycle must be repeated.

Operation of start of cycle has code "25" and is performed on the instruction "Start cycle n" (H4n). On the instruction "Start cycle n" (H4a) the group of instructions, beginning from the instruction in the location a and finishing in the instruction " E 4 a" is performed repeatedly.

The word "n" is specified as the difference between the various and the minimum significant values of variable addresses and can have upto 11 binary digits. If on the instruction "Start cycle n" (H4n) the addresses of several instructions are changed, the word "n" for all these instructions must be equal and their addresses must be only the complete locations or only the incomplete locations, correspondingly. When the addresses of the complete locations are changed, the word "n" must have a mark of one (1) in the 12th digit.

In the instruction with variable addresses, only the last (maximum) variable address is recorded.

At the execution of the instruction "Start of cycle n" (Н 4 n) in the first cycle from the address of variable instruction is subtracted the word "n" and the address of the first (minimum) location is formed, but in the last cycle, zero is subtracted and address of the last (maximum) location is formed. The addresses are changed from the maximum significant value of the addresses by one in the case of incomplete locations and by two in the case of complete locations.

Number of cycles in the first case is equal to (n+1) and in the second case this is equal to ($\frac{n}{2}$ +1).

Operation of summation of words has code "26" and is performed on the instruction "Summarise a" (C Ma). The instruction "Summarise a" executes the addition (C Ma) of the word in the location "a" with the contents of the adder. The overflow signal of the adder is blocked. The carry one from the sign digit is added to the first digit of the adder.

The operation is designed to calculate the control sum-check with reference to magnetic tape and punched tape storages.

Operation of change of instruction has code 30 and is performed on the instruction "change by a" (Ч 3a). On the instruction "Change by a" (Ч 3a) the contents of location 'a' are transferred to the instruction register, and, in the next cycle is summarised with the instruction selected for execution; after the execution of obtained instruction, the register is cleared.

The operation "Change" (Ч 3) is designed to change the instruction together with general way of the change of the instruction by the arithmetical device. The addresses of the instruction and the number of the operation can be changed. Two instructions "Change a" (Ч 3a_1, Ч 3a_2) can be located one after another.

At the execution of the operation "Change" (Ч 3) signal w generated in the preceding cycle is preserved.

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Other Operations :

Operation of reference to punched tape has code 31 and is performed on the instruction: $\Pi\Pi a_1$ (1 c, a_2)

This instruction executes recording of the contents of zone C from the punched tape to the magnetic drum storage beginning with the location "a" and ending in the location "a2" inclusive of both.

Operation of reference to magnetic tape for reading has code "31" and is performed on the instruction : $\Pi\Pi a_1$ (2e, a_2)

This instruction executes recording of the contents of zone "C" on the magnetic tape to the magnetic drum storage beginning from location "a" and extending upto the location "a2", both inclusive.

Operation of printing has code "32" and is performed on the instruction "Print" ($\Pi 4$).

Operation of punch has code "33" and is performed on the instruction "Punch". ($\Pi 4$).

The instruction punch the contents of the adder.

Operation of computer stop has code "37" and is performed on the instruction "Stop a" ($Oc\,a$). The instruction "Stop a" ($Oc\,a$) stops the execution of the programme on the next instruction and records the word from the location "a" into the adder.

Operation jump of interval during printing has code "34" and is performed on the instruction 'Interval' (ΠUH).

The instruction "Interval" (UH) executes jump of interval on the paper tape before printing the next result.

For jump of interval "a" the instruction "Interval" (UH) is necessarily used "a" times.

Operation of reference to Magnetic Tape for recording has code "31" and is performed on the instruction [redacted] $\Pi\Pi a_1$ (3 c, a_2)

This instruction executes re-writing on the zone "C" of the magnetic tape from the magnetic drum memory, beginning from location 'a_1' and including point and extending upto location 'a_2' both inclusive.

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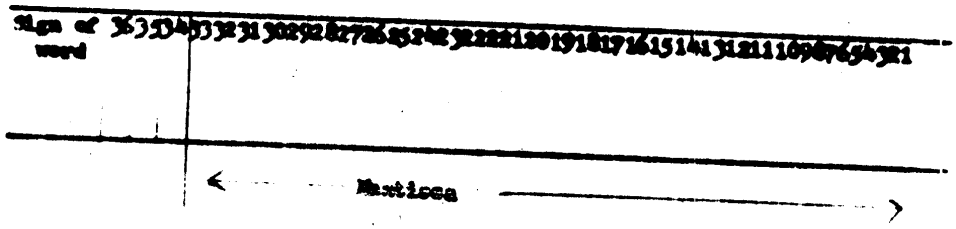
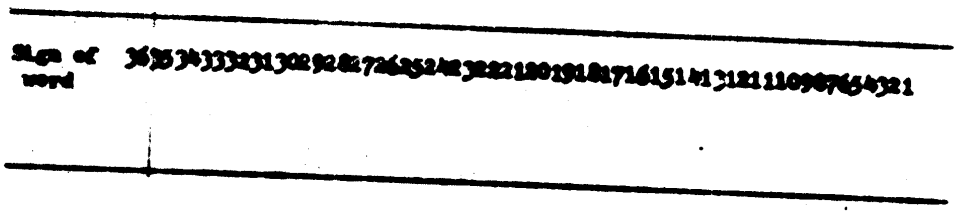
FIG. 1.

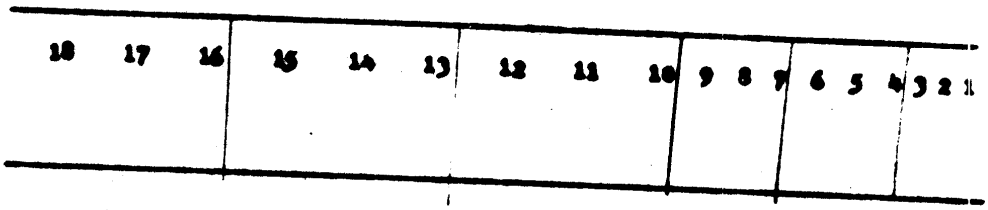
a) Placing of binary word in complete location



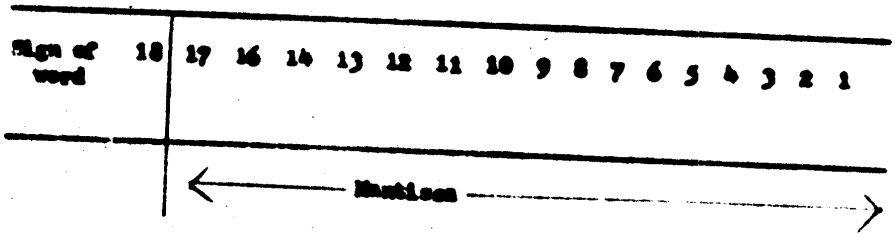
b) Placing of octal word in complete location



c) Placing of binary word in incomplete location



2) Placing of binary word in incomplete location



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Placing [illegible] in complete location

18	17	16	15	14	13	12	11	10	9	8	7	6	5
Sign of change of address at the execution of the instruction "Start cycle n° ( )		Operation										Mark of complete location	

b) Placing of instruction "Send K" (ПСК) in complete location

18	17	16	15	14	13	12	11	10	9	8	7	6
Operation							← Sign of word "K"					

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